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The Chemical Age

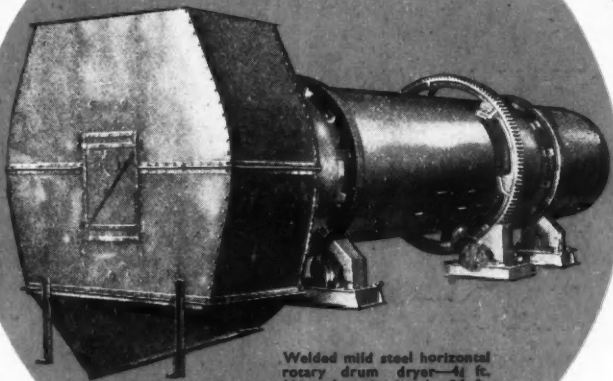
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VOL. L
No. 1300

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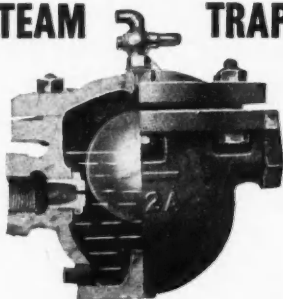
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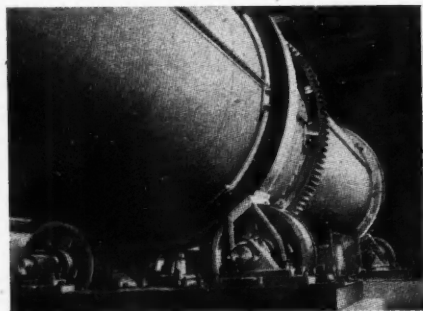
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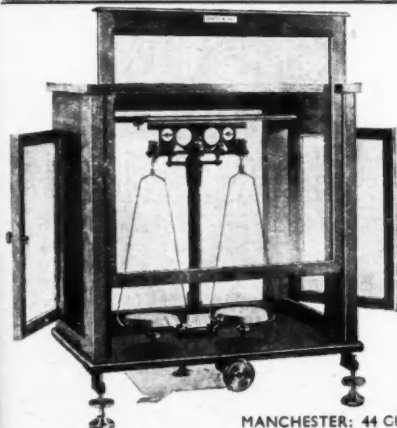


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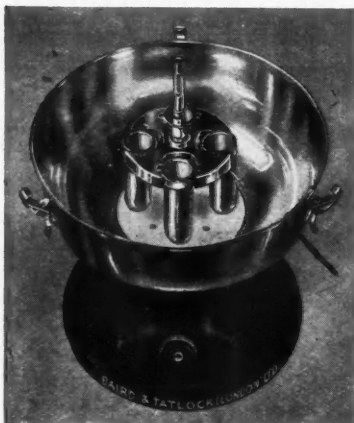
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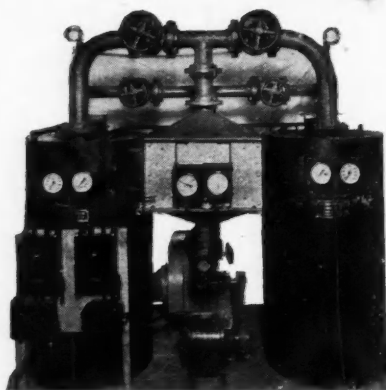
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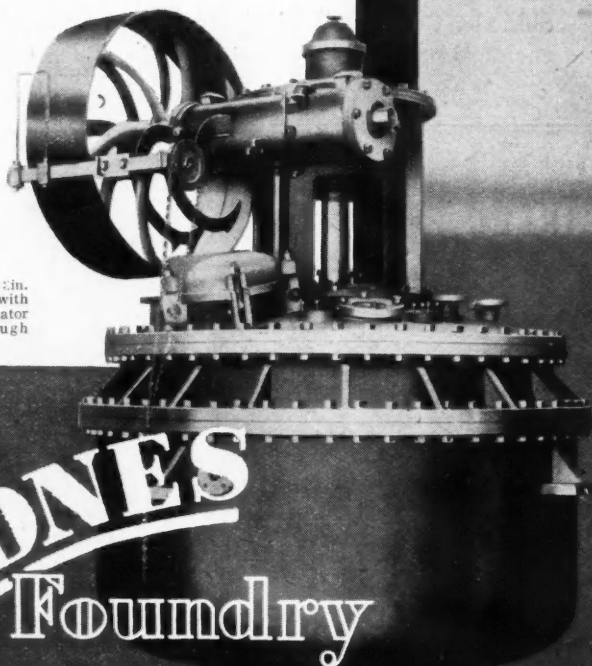
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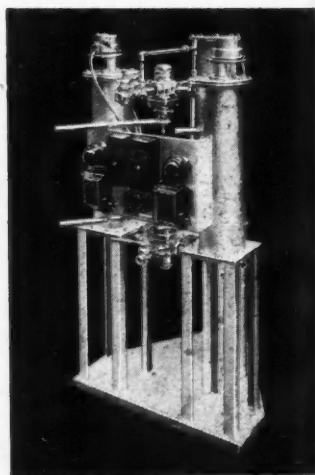
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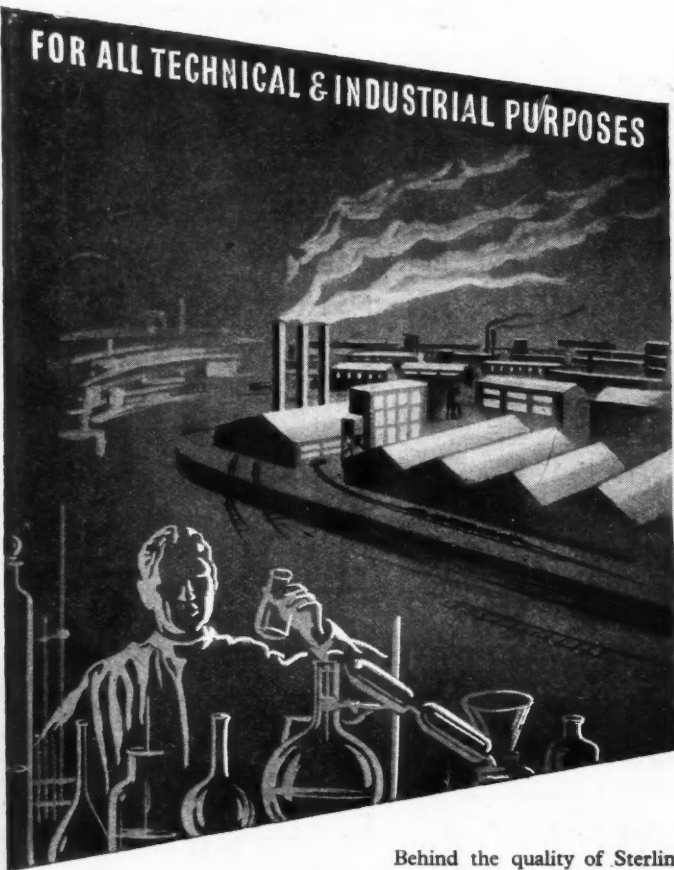
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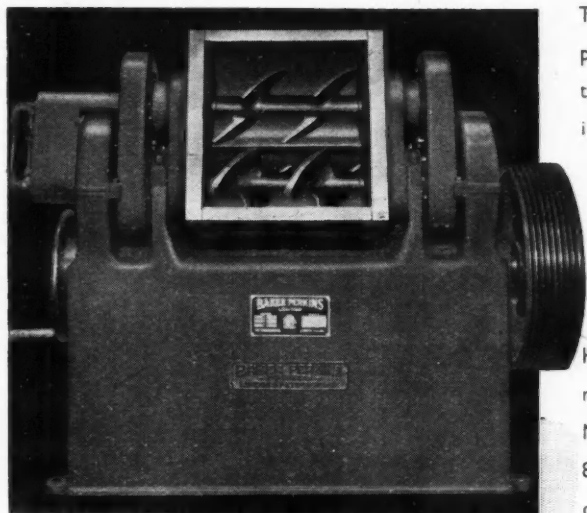
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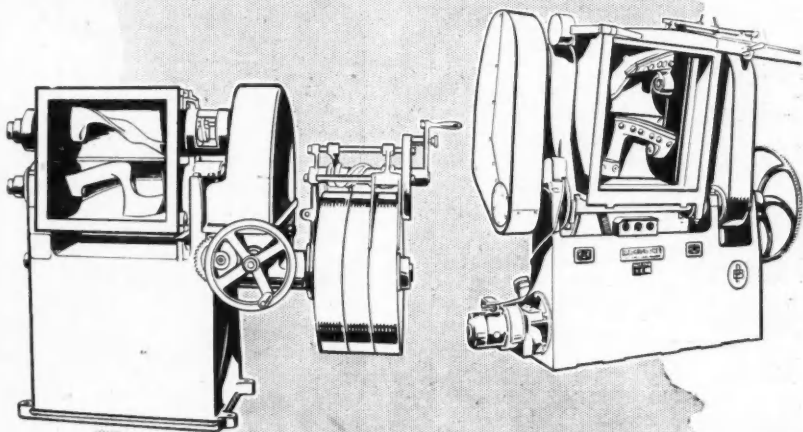
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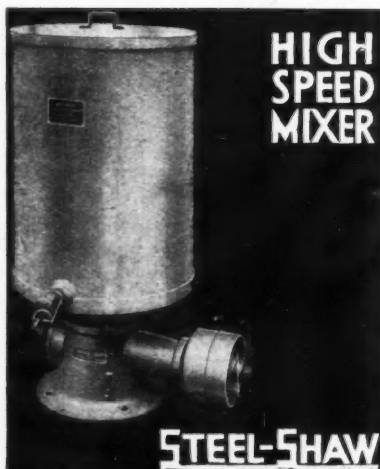
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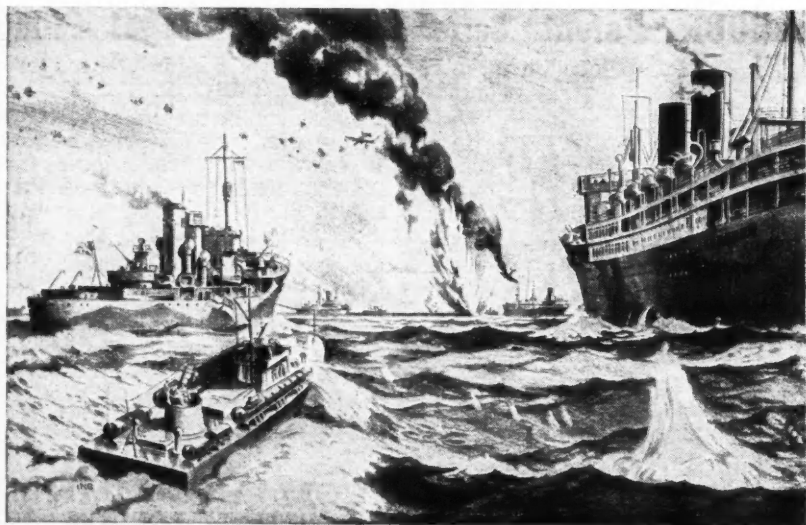
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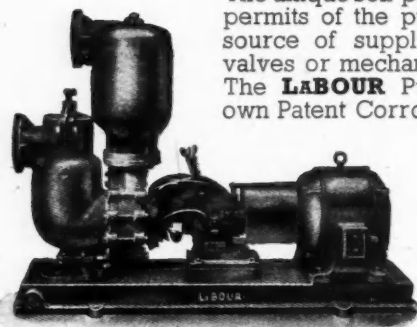
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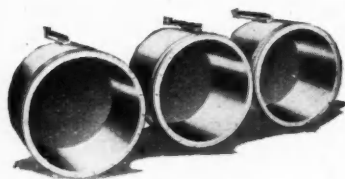
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May 27, 1944

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Interest in the Works

CO-OPERATION and co-ordination are words that to-day are on the lips of many men. Indeed, THE CHEMICAL AGE must plead guilty to having employed them lately with almost undue frequency. In extenuation we would argue that these words express ideas which, properly regulated, can lead to nothing but good. In general, we have most usually advocated co-ordination within an industry rather from the technical point of view, with the idea of avoiding some of the more obvious sources of confusion. Such co-ordination, of course, affects mainly the executive and administrative sides of an industry, and its objective is limited—for it can be carried too far, as Dr. Hermann Levy pointed out in a recent issue of the *Manchester Guardian*. What is really a more fundamental type of co-ordination, and one which has no limit to its usefulness, is that which aims at securing the co-operation in the industry of the individual operatives employed therein. There is no need nowadays for an employee to regard all advances made to him with a mistrustful eye. Thanks to the work of the Trade Unions and to progressive social legislation, his position is as secure as anybody's in the firm, and he can, and

should, regard the work of the firm as of importance to himself as an individual.

It is the duty of an efficient administrative staff to see that every employee, then, has the opportunity of knowing something about the work of the firm and of interesting himself in it. Here, of course, it is the small concern that has the advantage. It is possible for the chairman or managing director of a "family business" to talk to every worker individually, and to give him an interest in what is going on; indeed, in the well-run family business, this process is regarded as a matter of course. In the large company with many ramifications such a procedure is impossible; and it has been found that industrial morale has suffered because of the impersonal nature of the management:

the employee regards himself as of small interest to the business, and consequently takes small interest in the business. Some of the wiser managements in large concerns have lately been looking round for means to counteract this tendency; and they have been successful in finding certain useful and simple methods. We have devoted part of this issue to a description of some of the methods available, such as the poster,

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the leaflet, and that ingenious and helpful contrivance, the Synchrophone. There is no need for us here, therefore, to go into the details of the systems adopted, but it is worth while to consider the principle underlying them.

Although in the broadest sense, the idea at the back of all these methods is primarily educative, care must be taken to steer clear of the grandmotherly or nursery-governess attitude. Those who look at posters, or listen to the lectures provided are adults, not children; and we are glad to record that this point appears to have been fully appreciated in most cases that have come to our notice. We have heard, however, of occasions where "educative" leaflets were slipped into pay-envelopes, and we frankly regard this as an intolerable infringement of the privacy of the individual. We are not surprised to hear, therefore, that far better results have been attained by simply allowing the leaflets—placed in a conspicuous position—to be picked up by those interested, and read afterwards at leisure. The cynical will doubtless expect that the leaflets will later have been found thrown aside, or the posters defaced. Such, however, has not proved to be the case, and of the 50 per cent. of the employees of one firm who are known, by observation, to have taken a leaflet away with them on leaving work, not one destroyed it or threw it away before reaching home. Subsequent conversation, furthermore, confirmed that the leaflets had in most cases been in fact read with some care. This speaks highly, we consider, both for the intelligence of the workers and for the immediate appeal of the leaflets.

Simplicity and clarity, indeed, are as essential in the make-up of a leaflet of this kind as they are for display posters; experience has proved that to be the case. It is only too easy to fatigue, with wordiness or confusion of detail, the mind of one who, after all, has been doing a day's work on the subject-matter concerned. In other words, make it snappy! We think that this end is attained in the other system that we have already mentioned—the combined method of eye and ear training, and/or entertaining, known as the Synchrophone. This is undoubtedly a valuable method of arousing and holding the interest of

every worker, and it has the merit of combining a graphic clarity of illustration with a lecture-vocabulary remarkable for the absence of high-flown phraseology. We have seen it in use both as a means of explaining machinery of a highly complicated nature, and as a frank appeal to the sentiment of all workers. This last was with the idea of co-ordinating their individual efforts with the objective of the finished product—in this instance the shooting-down of German aeroplanes. In an industry such as chemical manufacture, where the ultimate purpose of the product turned out—whether it be for warlike or peaceful ends—is not always immediately obvious to everybody concerned, such a system has good points that stand out at once. Imagine, for example, a series of pictures showing the ultimate uses of all the products of tar distillation—or even a few of the more striking uses—we feel that this could not fail to strike a note of interest in the mind of everyone concerned in the processes involved, especially if they were explained in a series of straightforward talks.

Another way of co-ordinating the work of various departments in a large establishment consists in the arrangement of different components on a demonstration board, which is then mounted on a trolley and wheeled from shop to shop through the works. The advantage of this is obvious: workers are enabled to see their own special work interlocked with the work of others and helping to build up a complete whole, and they can thus gain that feeling of satisfaction which only completion can bring about. No doubt other methods of attaining the same end have been tried in other quarters; and we should be most interested to hear of any systems that have been adopted and to discuss them in our columns.

It is, in short, a simple enough matter to arouse and hold the attention of the worker; but that is only half the battle, if we are to have a live chemical industry capable of meeting the strenuous conditions of post-war international competition. The next step is to educate the public to take an interest in the industry. An advance in that direction has already been made both privately and semi-officially; but that is a different story, the progress of which we hope to be able to recount another day.

NOTES AND COMMENTS

A World Trade Plan

REALISING the importance of re-establishing international trade as soon as possible after the war, the International Chamber of Commerce commissioned a sub-committee of its British National Committee to prepare a report on the subject. This report is now issued, and its subject matter merits the full attention of all interested in industry. Compiled "by business men for business men," the report is based on a sound ethical foundation of good-neighbourliness; and to achieve this end it recommends the establishment of certain international controls, such as an International Credit Institution for the purpose of stabilising exchanges, and an International Economic Tribunal for the settling of the inevitable conflicts. It is strongly advocated that all hindrances to world-wide trade should be reduced as rapidly and as thoroughly as possible, and all Governments are urged to subscribe to an international economic code, binding them not to resort to unilateral action to the detriment of other countries. It is noted that every combination in restraint of trade, whether created by Government or by private action, requires public supervision in the interest of the community at large, in order to prevent prices from being kept up, or output down, and to discourage the inefficient or high-cost producer. The potency of publicity as a weapon towards gaining this end is recognised.

Chemical Men on the Committee

A SUPPLEMENT on Britain's export trade maintains that our policy should exclude the use of political measures in an attempt to enlarge our share of world trade, and demands a liberal policy (in conformity with the Atlantic Charter) of opening the world's markets to the competition of British goods on their own merits, while improving the efficiency of production and sale of those goods. Special attention is also given to the re-development of those areas that have been devastated by war. It will be seen that so all-embracing a plan should be perused in the original, as space cannot allow us to discuss it fully here. Industrial chemists, especially,

will be interested to note that the sub-committee which prepared the report contains such members as Mr. Forrest Hewit, chairman of the Chemical and Allied Trades section of the Manchester Chamber of Commerce; Mr. Geoffrey Heyworth, chairman of Lever Brothers and Unilever; Lieut.-Col. R. M. P. Preston, director of many metal companies and a well-known figure in metallurgical science; and Sir Robert Robinson, Waynflete Professor of Chemistry at Oxford.

Chemists Behind Air War

AMERICAN production of aviation fuel received some attention in THE CHEMICAL AGE of May 13 (p. 453). Since then, more details have come to hand and these serve to show how important a part the chemists played in making that production possible. The U.S. Petroleum Administration calculates that about 65 per cent. of the increased production of 100-octane petrol achieved in the two years following Pearl Harbour was figuratively "wrung out of a hat" by chemical ingenuity and mechanical adjustment. Only 35.5 per cent. of the total output came from new plants. The policy of making the best of existing plant rather than concentrating on the erection of new units is understood when one realises that an average 100-octane plant takes as long to build as an aircraft carrier and requires more man-hours than goes to the construction of two destroyers! An assessment has been made of the various factors that contributed to the 65 per cent. increase based on technological improvements. The use of cumene as a blending agent accounted for 22.8 per cent.; conversion of catalytic cracking units to aviation fuel production, 13.8; use of co-dimer in blending, 9.1; addition of tetraethyl lead, 3.5; use of toluene and miscellaneous blending agents, 1.3; mechanical improvements, etc., 14 per cent.

Stockpile Policy

IN the "Notes and Comments" of our issue of April 15 (p. 350), we referred to a recent statement by a U.S. Government official to the effect that America should import as much as possible of all strategic raw materials and use as little

as possible of her own precious remaining supplies. There was nothing to indicate that the statement represented U.S. Government policy, but the impression that it might do so is reinforced by a speech of Mr. H. L. Ickes, U.S. Petroleum Administrator, to the Economic Club on May 9. Mr. Ickes outlined the "positive, creative programme" which America needs in respect of oil. The three planks to that programme are the stimulation of oil exploration in the U.S.A., the efficient use of oil to ensure supplies lasting as long as possible, and access to foreign oil resources to supplement domestic resources. Mr. Ickes recommends, too, that America should "stockpile" oil products both at home and at strategic points throughout the world so that "we shall have it where we need it when we need it." A similar view has been expressed by the Truman Committee of the U.S. Congress, and the direction in which American economic policy is likely to move becomes increasingly clear. The implications of such a policy have been discussed by us on more than one occasion, so there is no need to go into them again beyond pointing out the necessity for Britain to decide upon and to operate a policy with regard to raw materials as definite and as far-sighted as that mooted in America.

Rehabilitation

IN view of the approaching climax in military affairs it is not unnatural that everyone should be thinking of those who will participate in the battles which are about to be fought. Anxiety prevails in the hearts of all who have husbands, sons and friends on active service. Anxiety—not for the success of the operations which are pending, but anxiety for the well-being of those whose return they await. What does the future hold for men who, in winning the war, lose their physical capacity for enjoying the peace? Will the worker who has lost a limb be awarded some paltry pension and then cast on the industrial rubbish-heap of unemployment? According to the Government the answer is definitely—No! Sir Walter Womersley, addressing members of the British Legion—of which he himself is a member—in a recent speech, declared that "money compensation is all right to a reasonable amount, but the

real thing is to help a man to help himself, and give him self-respect and the opportunity of standing alongside his fellow men and work as well as them." The best brains in the Government, added Sir Walter, are now engaged in planning an extension, in post-war years, of the existing scheme for the rehabilitation of the disabled.

Industry's Duty

THE ultimate success of any Government plan, however, depends to a large degree on the willingness of the various industries to provide the disabled man with the opportunity of doing a skilled job. The idea that a man who has lost a limb, particularly an arm, is unfitted for skilled employment and can only expect work of a menial character is not merely unfair to the individual but, generally speaking, absolutely erroneous. His capacity for concentration is usually highly developed and he often possesses a high degree of manual dexterity. Factors such as character, intelligence, age and experience are more important than the disablement itself in determining capacity and, as employment is the object in view, the factor of disablement should be considered not in its personal sense but in its relation to employability. It is essential, therefore, that every facility be provided in helping these men to obtain worth-while jobs, for disablement represents a double loss to the community: a reduction of the total productive capacity and an increase in the cost of maintenance and remedial services.

MISCELLANEOUS CHEMICALS

From June 1 the work of the Miscellaneous Chemicals Control will be absorbed in the headquarters of the Raw Materials Department of the Ministry of Supply, 6 Carlton House Terrace, S.W.1 (Whitehall 4341). Mr. C. A. F. Hastilow will continue to be in charge of the work relating to paints and will become Director of Paint Materials in the Raw Materials Department; his address will remain at Terminal House, 52 Grosvenor Gardens, S.W.1. (SLOane 2271). The services of Mr. D. J. Bird, M.B.E., the present Controller of Miscellaneous Chemicals, and of Dr. J. S. Carter, F.R.I.C., and Mr. D. G. D. Greenhough, Deputy Controllers, will continue to be available to the Ministry in an advisory capacity.

Solvent Extraction—II

Extraction from Crude Vegetable Drugs

by G. COLMAN GREEN, B.Sc., F.R.I.C., A.M.I.Chem.E.

(Continued from THE CHEMICAL AGE, May 20, 1944, p. 479)

IN contrast with sugar beet as raw material, drug-containing vegetable materials arrive at the factory dry and dead. Death has been brought about by extreme desiccation, and, as in the sugar-

contact with dried sheet gelatin it is imbibed and, very approximately and in suitable conditions, the gelatin returns to the original volume it possessed before drying. Now if a crystalloid were also

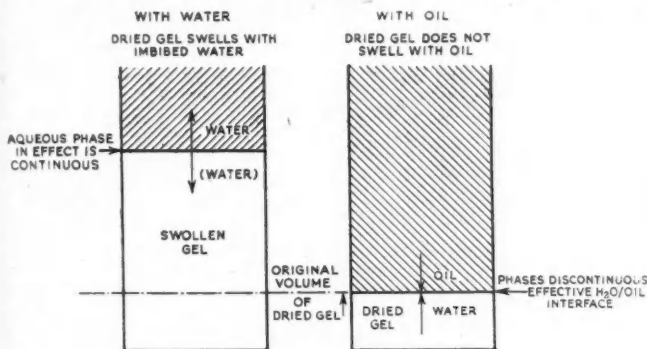


Fig. 1. Extraction of dried gel: diagrammatic representation of status.

beet cells where it is brought about by heat, the protoplasm is irreversibly coagulated and shrunken. Moreover, the retaining cell walls are also dehydrated and much distorted. The important point of contrast is that in the case of the sugar beet, the water in the cell sap comes into continuous phase with the sweet waters and there is no impediment to free diffusion immediately the selectively permeable cell membrane has been destroyed by heat; whereas, in the case of the drug, water has been removed down to a residual content of 5-10 per cent.; there is, therefore, no cell sap with crystalloids in solution. These substances will have been precipitated, as drying of the drug has proceeded, either in a micro- or macro-crystalline condition according to circumstances. If aqueous extraction is to be attempted the original water content must be restored to some extent.

The effect of drying protoplasm is similar to the drying of a gel as in the manufacture of gelatin. The jelly contains about 20 per cent. total solids and is dried down in a drying tunnel to sheet gelatin containing 85-90 per cent. total solids. When water is brought into

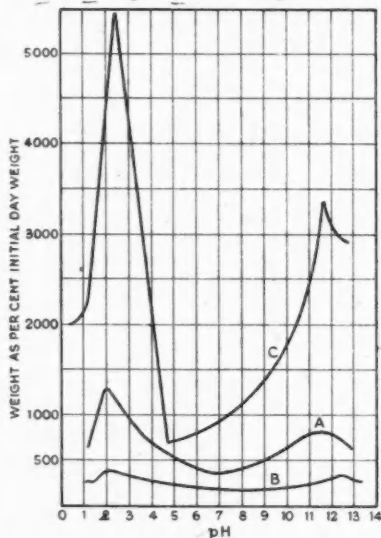
present in the gelatin before drying it would crystallise out as drying proceeded and as its solubility product was exceeded; but such is the effect of the presence of colloids on crystallisation that the crystals would be in the form of micro-crystals dispersed throughout the gel. When water is brought into contact with the dried gel and as imbibition becomes completed, the solute can be re-dissolved and, since the aqueous phase is virtually continuous, diffusion of the solute can commence, and so it passes into the aqueous solvent. In certain circumstances the gelatin may act as a semi-permeable membrane and thus permit selective diffusion out of itself; but this complicating feature may be ignored at the moment.

It will be clear that, if a non-polar solvent be used, the situation will be very different. Firstly, diffusion must take place across an oil-water interface as the dried gel uniformly still contains 10-15 per cent. of water. This is made the more difficult since no imbibition, and therefore, no swelling occurs, and the surface of contact is correspondingly less than it would have been had swelling

been possible. Secondly, diffusion through the gel to the interface has to take place in an extremely viscous medium. And, thirdly, as solute passes from the gel to the solvent the micro-crystals precipitated by the drying must gradually re-dissolve to maintain equilibrium within the gel, and this may well be the limiting factor in the rate of extraction. The position is shown diagrammatically in Fig. 1 and represents fairly accurately what is likely to happen in the drying and subsequent extraction of protoplasmic material.

The above comparison has an important practical bearing, in that when dried crude drugs are to be extracted with non-polar solvents, it is essential that the degree of comminution be carried further than when extraction is by aqueous solvents. Thus, the increased superficial area compensates for the reduced rate of the diffusional processes within the dried gel, and extraction is accomplished within the desired normal time limits.

Wherever possible in drug extraction,



A. FRESH GOATSKIN. B. DRIED GOATSKIN. C. LEAF GELATIN.

Fig. 2. Influence of structure on degree of swelling.

(KAY and JORDAN-LLOYD, *Proc. Roy. Soc., B*, 1924).

polar solvents, such as water itself, alcohol, or chloroform-water are used; but in many cases it may be necessary to

employ non-polar solvents, such as ether, chloroform, benzol, etc. Sometimes a compromise may be achieved by steeping the dried drug in water so that it may imbibe all it can, and the active principle is then extracted with a non-polar solvent. The effect of this treatment is, as described in the case of the gelatin gel, to reduce viscosity within the gel and at the same time to increase the area of contact relative to the weight of total solids. It may even be practicable to make a concentrated suspension of the drug after soaking in the polar solvent, and then to extract the active principle by bubbling the non-polar solvent through the suspension. This would be, in effect, a combination of maceration and liquid/liquid extraction, the solid material functioning as a sort of tower packing.

Degree of Swelling

The dried drug may swell greatly as it imbibes water, and this must be taken into account when designing and packing extraction vessels. Each case must be considered individually from this angle. Materials of natural origin vary considerably in the degree of swelling on imbibition; but, as a rule, where there is a compact organised structure the swelling is less than where relatively unorganised material is under consideration, and this is brought out in Fig. 2. One is reminded in this respect of a number of disasters which have occurred when grain in silos has been allowed to get wet.

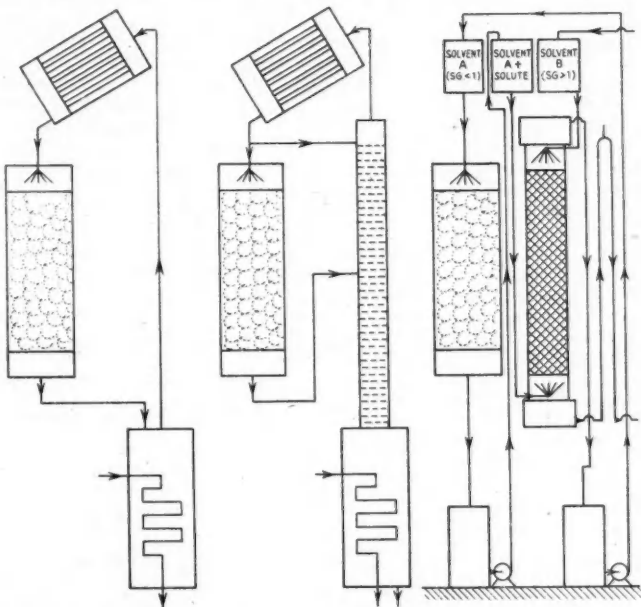
The literature of drug extraction is not at all satisfactory and H. Fischer¹⁰ has pointed out that the proper conditions must be determined by experience in each case, since insufficient data exist for calculating in advance the apparatus required. He regards the specific surface area of the drug as an important factor. Peck¹¹ has observed that there is no information on the mechanism by which plant materials are extracted except that, by analogy with what is known of the mechanism of the creosoting of wood, the direction of diffusion is mainly longitudinal, that is to say in the direction of the conducting elements of the tissue.

As in all diffusional processes, the rate of transfer is directly proportional to the area involved, and this relation is expressed in diffusion equations from that of Fick¹² onwards. For this reason plant material is comminuted before extraction in order to present a greater interface to

the solvent, thus increasing what would otherwise be a slow rate of extraction. However, if the comminution is carried too far, the increased rate of extraction does not compensate for the cost of extra power used in grinding, and also the

which is usually vertical, but which may be horizontal, in which the material to be extracted is packed direct or in an inserted basket. A strainer or filter (or both) is placed at the bottom outlet to clean up the solution before it passes

Fig. 3.
Percolator
lay-outs.



danger of silting up the bed with fine stuff develops. If comminution is not carried far enough, channelling may occur. As examples of the effect of particle size, Scott¹³ found that channelling was more serious in towers packed with $\frac{1}{8}$ -in. than with $\frac{1}{4}$ -in. coke; while Clotworthy¹⁴ quotes Fischer to the effect that drugs should be disintegrated to less than $\frac{1}{8}$ in. The directions in the various monographs of the Pharmacopoeia¹⁵ are usually descriptive in general terms of fineness and coarseness, and these terms are more accurately defined in an Appendix¹⁶ by the mesh sizes of a range of sieves which conform with British Standard Specification¹⁷.

Despite all that has been said, there is a fair measure of standardisation in general lay-out of drug extraction plant. Some characteristic lay-outs are shown in B.S. symbols¹⁸ in Fig. 3. Fundamentally, the plant consists of a cylindrical vessel

from the extractor. Usually, depending upon size of unit, there may be a perforated false bottom. The goods are usually kept wetted by the solvent by means of a U-loop after the Soxhlet principle, in which simple multiple contact with an infinite number of stages virtually results. Otherwise, where very large extractors are used, the wetting may be maintained by adjustments of cocks or pump-rates. Provision is usually made for stripping residual solvent from the exhausted material by means of steaming. The solvent may be separated from the solute by evaporation with or without rectification or by liquid/liquid extraction. Where evaporation is used, the percolate runs from the extractor continuously into the evaporator.

In recent years there have been some advances, mainly directed towards the more rapid exhaustion of the drug, the preparation of improved extracts, the

more complete exhaustion of material, and so on. Among those advances is the development of "diacolation," described by Breddin and Peck^{19, 20}, in which the solvent is passed upwards through the goods packed in baskets in a battery of cylindrical elements in series somewhat resembling a sugar-beet diffusion battery. Among the advantages claimed are the absence of "packing" of the material and a displacement method which approaches quantitative filtration. Bari²¹ prepared a number of tinctures by six different techniques which included that of diacolation. Judged by colour, clearness, total solid content, and content of active principle, diacolation gave the best results.

The question of the direction of flow of solvents through the goods has been a bone of contention. Upward flow has the advantage that it does not pack the material, it displaces air from the system with ease, and it counteracts the tendency of the stronger and more dense layers to settle. Yet downward flow, other things being equal, is usually found satisfactory in practice and does not require the expenditure of additional power.

When plant material is dried there is

walls and contents of cells do shrink and a considerable amount of distortion occurs and even tearing away as, for example, at the middle lamella in parenchymatous tissues. As a consequence, air diffuses into these newly made interstices. This trapped air impedes the contacting of the solvent and solid, and substantially reduces the effective interface. Vacuum has been applied in certain cases to remove this trapped air prior to the admission of the solvent to the extractor and immediate and thorough penetration of the material by the solvent is attained. Yet, here again, the advantage gained is not considered to justify common use in this country except in the extraction of vanilla beans, where the structure is compact and woody and full of air pockets.

Stirring is a problem which settles itself according to the nature of the material being extracted. If there is an inherent tendency for the material to pack down and become impervious to the flow of the solvent, stirring must be resorted to. Stirring is universally practised in the solvent extraction of oil seeds, offal²², and such like material, and standardised plant is available. It is, how-

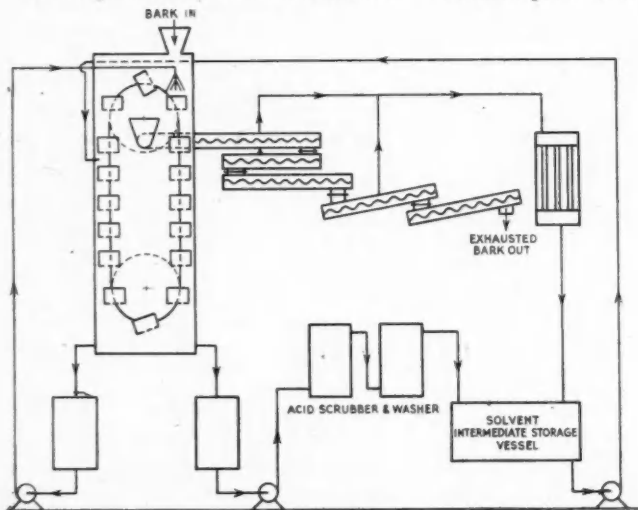


Fig. 4.
Continuous
quinine-extraction
plant.

no extensive collapse of the cells themselves, as the cell walls—especially the highly liquefied ones—are sufficiently rigid to prevent this. However, cell

ever, not the practise to stir in drug extraction, as the goods, if properly prepared, are sufficiently "open." There is an interesting parallel offered by the

brewing industry in the stirring of mash-tuns. Once the goods are settled, stirring should not be necessary in order to run off the wort in a clear, bright condition. If the malt has been sufficiently modified and the mashing conditions have been suitable for optimum conversion, then the wort should run off freely through the bed of husk on the false bottom as, also, should the subsequent sparge. However, if the malt has been poorly modified or the conversion has been poor, the goods cease to be "open" and tend to pack down and impede the even running-off of the wort and sparge, and it may be necessary to give the rakes a turn or two, especially during sparging.

As in the case of sugar-beet diffusers, so continuous diffusers in which solvent and solid pass in counterflow have been made

and have found some place in America for the extraction of oil from mealy material; but it is doubtful whether the method could be suitably or justifiably employed in drug extraction. However, R. C. Vetter²³ describes an apparatus for the semi-continuous extraction of quinine from cinchona bark which is shown diagrammatically in Fig. 4. Vetter accompanies his article by an interesting photograph of the actual plant by Bollmann.

In America dual-purpose plant is available for either continuous drying or solvent extraction with or without vacuum. No data are available concerning performance and, here again, the plant seems to be limited to handling mealy or granular material²⁴.

(To be continued).

Co-operation on the Plant Works Information Systems

AS has been indicated elsewhere in the columns of this journal, there is a growing tendency to-day for firms to seek the co-operation of their employees, whether in the office or the workshop, by securing their personal interest in the work in hand. The craftsman is justly demanding—and is likely to obtain—a measure of security equal to that of his colleague in the counting house or the drawing-office; and in return for this he is rightly expected to give a full measure of intelligent interest to the concerns of the company for which he works. Yet, however willing he may be to co-operate in this wise, a difficulty arises if he does not understand exactly with what objective—apart from the obvious one of making a living for all hands—his firm is working.

Wise administrations have taken this matter in hand, and have thought out methods of interesting their employees in the various ramifications of the business. Two valuable ends are served thereby: (i) the employee is enabled to see how his particular job fits into the general scheme of things; and (ii) the interests of the firm are furthered by the possession, within its ambit, of workmen who know what is happening, and can see that it is to their own interest that the wheels should turn smoothly. Furthermore, by the establishment of Joint Production Committees, valuable suggestions are obtained from craftsmen who not only know their own job but can also see how it fits into the general plan of operation.

There are several perfectly straight-

forward ways of awakening the interest of the employee—but like most simple inventions, they had to be thought of first! One of the simplest is the direct appeal of posters. The factory poster display board is by now quite familiar; but most posters have hitherto dealt with a subject not directly concerned with the work on hand, but rather affecting it indirectly, such as Safety, Fuel Saving, or Industrial Hygiene. Recently, however, the Imperial Smelting Corporation have produced a series of posters with the prime objective of bringing home, to everyone in their works, the importance of their products towards the furtherance of the war effort. Zinc and sulphuric acid—the principal products concerned—do not possess an immediate and obvious connection with the engines of war; and people engaged in their manufacture may possibly feel that their efforts have only a remote effect on the progress of the war. That impression is soon dispelled by the posters, however, and a direct connection established. We reproduce here a couple of the posters (Figs. 1 and 2), but they lose much of their appeal when colour is absent and size greatly reduced. The cartoon by Mendoza is noteworthy, as it illustrates a second stage of the "interest" campaign, wherein an appeal to the sense of humour reinforces the feeling of satisfaction in the actual work. It should be pointed out that the posters are displayed in certain specified sites throughout the works, and are changed at regular intervals by someone specially appointed for the job.

Significant results were obtained by the

same company from a somewhat similar scheme, in which leaflets play the principal part. Distribution of these leaflets—two of which are depicted here—was an entirely voluntary business; they were not inserted in pay envelopes, as has occasionally been the practice elsewhere, but merely left, for anybody concerned to pick up, in one or two conspicuous places throughout the works. This voluntary system is highly to be recommended, as it in no way infringes the workers' privacy as individuals. Scoffers no doubt would prophesy that the majority of the leaflets would be simply picked up, and thrown away unread; but such has not proved to be the case. It was found that at least 50 per cent. of employees of all grades gave themselves the trouble to take away leaflets, and in no case were these found lying about the works or in the neighbouring streets. On the contrary, they found their way into the homes of the workers, and conversation has shown that they were appreciated wherever they went. Admittedly, the desire to play an active part in the war effort has given a fillip to



Fig. 1. Poster illustrating the connection of chemical products with the war effort.

the tendency to take a serious interest in the work; but now that the principle of individual interest is admitted by all, there should be no difficulty in prolonging the system when the war is over. No feeling

is more discouraging than frustration; and there is no better corrective to that than the realisation that *your* work matters. A few brief sentences and well-chosen pictures (Fig. 3) can convey that message more



Fig. 2. The cartoonist aids the chemical industry.

quickly and more simply than any other means. In the chemical industry, particularly, where the immediate purpose of many of the products manufactured is not especially obvious, these methods of awakening interest in the works might well be more extensively employed.

A more formal system of interesting the worker is through the medium of the films, coupled with small internal exhibitions, and these methods have been used with good effect. Still better is the semi-instructional, semi-propaganda method operated by means of the instrument known as the Synchrophone, manufactured by I.S.M., Ltd., Panton House, Haymarket, London, S.W.1. This instrument, a brief description of which was given in *THE CHEMICAL AGE* on December 12, 1942, is the result of several years' development by the inventor, Mr. N. Sandor, managing director of I.S.M., Ltd. It was designed originally with the purpose of speeding up the technical instruction of R.A.F. personnel, and its objective was to overcome the defects of the old system of technical instruction which often failed in its purpose because of lack of imagination, or even sheer physical exhaustion, on the part of the instructor. Its

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application to technical instruction in the widest sense is obvious.

The great advantage of the Synchrophone over the wireless lecture, on the one hand, and the illustrated lantern-lecture or black-board-talk on the other, is that it maintains the personal relation between lecturer and class without exhausting the lecturer. Further, it enables a skilled craftsman, who very often lacks the ability to impart his knowledge to others, to amplify his own technical skill through the words of a practised lecturer. The method by which this end is achieved is comparatively simple—but it required thinking of.

The Synchrophone, in its simplest form, is seen in the accompanying illustration (Fig. 4), which shows it to be made up of a sound-reproducing unit in the form of an automatic-change electric gramophone and a vision unit comprising a frame 3 ft. by 2 ft. by 6 in. in which is set a plate of translucent glass. On this pictures appear to illustrate the various points to be emphasised as the picture proceeds. At predetermined times during the lecture the record automatically operates a switching system which causes the desired illustration or illustrations to appear, and arrows, etc., flash on and off at the appropriate moments. The pictures are in colour and can be used to explain the build-up of a complicated mechanism while the voice is describing it. The relation of the various parts of an instrument, which are not normally visible, can be clearly shown, while details which would tend to confuse the hearer can be kept in the background till the appropriate moment. Thus the whole picture can be built up as the talk proceeds. A wise tutor never runs through his lecture from start to finish and leaves it at that; he goes over

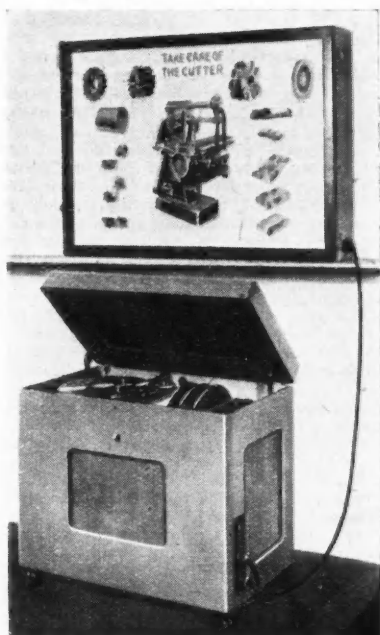


Fig. 4. The Synchrophone ready for a demonstration.

Fig. 3. Leaflets for chemical workers. Bold design and colour scheme give a "punch" to the appeal.



containing 30% of ZINC is the metal which
all these things better than any other.
Zinc of ZINC is required to make 100 cartridge cases
or 3.7 K.A. shells—and these shells are made in
hundreds of thousands.
That is how ZINC helps to shoot down German raiders.
So too does SULPHURIC ACID—without the acid
charge in the cartridge case, the high explosive
in the shell can be made without it.

ZINC and
SULPHURIC
ACID are
meat and drink
for the Guns

the matter again and perhaps a third time, knowing full well that it is during these repetitions that the subject matter "soaks in" and the listener really begins to understand the process or the mechanism described. Similarly, the Synchronophone is able to repeat the "lecture" as often as required.

The machine never gets tired and can deliver the same lecture or different lectures to successive groups of students hour after hour. Unlike the talking-film, which requires an operator, a dark room, and a considerable amount of equipment, the Synchronophone can be operated in ordinary daylight or artificial light by the trainees themselves in the simplest possible way. A point which can add interest is that when a new device is being demonstrated the voice of the inventor may be heard. The lecture can deal with broad principles or small details which make for efficiency. For example, the frame shown in Fig. 4 illustrates a talk on the care of milling cutters which is suitable for apprentices or girl operators. Lectures to teach workers how to obtain the highest efficiency from their machines, faults to avoid, and standards to be achieved can be arranged on similar lines.

The apparatus is compact and can easily be transported by car and set up in a small

do away with "highbrow" technical language, and there is no initial resistance to overcome as is often the case when a scientific treatise or technological book has to be coped with. Not everybody is able to adapt himself to the quick absorption of technical data. There are slow and fast students, and the slower brains are often those which take the firmer grasp of the material in the end. After any lecture, an interested listener, who has perhaps failed to grasp one or two of the points dealt with, can return to the apparatus and play the records over with the synchronised illustrations until he is quite satisfied.

Exhibition Trolleys

While the foregoing material was in the press, a copy of the *Production and Engineering Bulletin* (1944, 3, 17) came to hand, in which yet another "works information system" was described, in an article sponsored by the Ministry of Production. This takes the form of a transportable demonstration board or exhibition trolley (Fig. 5), used in this case by a firm of electrical equipment manufacturers to explain the purpose of the equipment.

In the management's own words: "The displays have proved invaluable. Operators in the machine shops . . . used to get very restless on the grounds that the work they were doing was not war work. We, therefore, arranged conducted tours into the various assembly departments, where the operators could see the completed articles, pointing out to them where the apparently insignificant little part they were making fitted into the final assembly. They quickly began to appreciate the importance of their work. To further the idea we constructed demonstration boards, mounted them on trolleys and provided them with suitable lighting which could be plugged into any convenient electrical point. The boards travelled round throughout the organisation, where they created an enormous amount of interest."

The application of the idea to chemical products is obvious; a series of test-tubes, for example, containing the various components of a plastic material, and leading up to the finished product, would make a striking display.



Fig. 5. Mobile demonstration board.

space such as a lecture room, the corner of a workshop or a show room.

Illustrations can be provided to suit any subject, and lectures delivered by skilled teachers can be recorded. It is possible to

Limited amounts of phosphate rock, with a sufficiently low content of iron oxide and alumina to enable the rock to be used in superphosphate manufacture, have been found at Lower Hermitage and Ororoo, South Australia, and parcels are now going regularly to Port Adelaide for treatment. The larger deposits of ferruginous phosphate rock, already well known, are being used in the manufacture of high-phosphorus pig-iron, and as a soil dressing in admixture with superphosphate.

British Plastics Federation

Annual Report

THE annual report of the British Plastics Federation states that the membership continues to increase. During 1943 nineteen members were elected to the Federation and the total membership at the end of 1943 was 220.

As a result of the extraordinary general meeting held in December, 1943, members approved the report of the Council on the reorganisation of the Federation. The various sections are now grouped together as follows with the membership as shown:

Group.	Section.
Plastic Materials (37)	Laminated Material Manufacturers (11). Moulding Powder Manufacturers (10). Synthetic Resin Manufacturers (12). Sheet, Rod and Tube Manufacturers (excluding Laminated) (13).
Moulders (109)	Moulders (107). Moulded Closure Manufacturers (11). Injection Moulders (48).
Fabricators (28)	Fabricators of Plastic Materials.
Engineers (34)	Mould and Tool Makers (15). Plant Makers (19).
General Members (32)	Mainly suppliers of raw materials such as phenol, plasticisers, etc.

The Federation reports that it was able to assist the Director of Scientific Research of the Admiralty in response to a request for additional advice on the use of plastics materials. Close contact is maintained between the Federation and the Ministry of Aircraft Production and the Royal Aircraft Establishment at Farnborough through the Aircraft Plastics Main Technical Committee. By courtesy of the Ministry, the minutes of meetings of this committee are circulated to members. The Laminated Material Manufacturers Section has continued to co-operate with the Society of British Aircraft Constructors in the preparation of schedules of properties of their materials and products. The Plastics Material Manufacturers Section has also prepared information on thermoplastic materials covering cellulose acetate, methyl methacrylate, polyvinyl chloride and polystyrene. This information is now being printed for incorporation in the S.B.A.C. Handbook.

For the purpose of maintaining closer contact with the Advisory Service on Plastics and Rubber of the Ministry of Supply on technical matters affecting mouldings, Mr. N. J. L. Megson set up a small panel of his

officials and representatives of the Technical Committee of the Moulders Section. As a result of this liaison the Department has placed a development contract for investigation work on high-frequency pre-heating of moulding powders, the firms selected being those recommended by the Moulders Section. The programme of investigation was also agreed jointly between the Ministry and the Moulders Section.

The Federation expresses its indebtedness to Mr. L. P. B. Merriam (Plastics Controller), Major T. Knowles (Coal Tar Controller), Mr. G. H. Duncan (Formaldehyde Controller), and Mr. R. Wilkins (Director of Special Supplies), for their assistance in regard to the supply of essential raw materials.

Standards

The Plastics Industry Committee and its Technical Committee have under consideration new specifications for aminoplastic moulding powders and cellulose acetate moulding powders, while certain amendments have been made to B.S. 771 Phenol-Formaldehyde Moulding Powders. A new Industry Committee, namely, the Adhesives Industry Committee, has been set up by the B.S.I. in the past year on which the Federation is represented.

As a result of further discussion between the B.S.I. and Mr. H. V. Potter, chairman of the Hall Mark Committee, and the general manager, an exchange of letters has taken place between the British Standards Institution and the Federation whereby the Hall Mark Scheme has been formally constituted. One member of the Federation has made application for a licence to use the Hall Mark in respect of a moulding powder in order to establish the procedure for obtaining a licence to use the Hall Mark. He has kindly undertaken to place the information he obtains at the disposal of the Federation before making use of it. This information will be circulated to members when it is available.

Export Groups

As a result of discussion between the chairman of the Moulding Powder Manufacturers' Export Group, Mr. Kenneth Chance, and the chairman of the Moulders' Export Group, Mr. Herbert Bridge, and Government officials, it has been decided, with the concurrence of the members of these two groups, that they should come within theegis of the Federation. They will form one special group as distinct from other groups formed under the reorganisation.

A School for Chemical Assistants

An Important M.O.S. Experiment

THE importance of the laboratory assistant and the technical assistant in modern science and technology—whether research, analysis, or process control—has been brought home to us by the war. Since 1939 it has been recognised that there is a definite shortage of this type of worker, while the lack of proper training facilities for recruits to this class has been admitted in reports such as that of the Royal Institute of Chemistry on education.

The war had not aged considerably before it was realised that the Government departments responsible for fitting out our Fighting Forces would require more technicians to take on the tasks associated with designing, testing and checking munitions—munitions in the widest sense of the word. The Chemical Inspection Department of the War Office had been transferred to the Ministry of Supply, and to meet the department's ever-increasing need for laboratory assistants it was decided to start a school for training personnel. This school was set up in 1941. The laboratories of a well-known public school were taken over for the purpose, and the courses started under the direction of Mr. F. C. Brown, an Oxford graduate in chemistry who held the dual qualification of having been a science master at Palmers School, Essex, and of having worked for a year in the Ministry's Chemical Inspection Department.

Some idea of the scale on which training has progressed can be obtained from the fact that in the three years since the school began 750 pupils, mostly girls, have been trained there. The students are recruited from those who have passed general school certificate with a credit in either mathematics or science. Two-thirds of the recruits come straight from school. Another point which is worth recording is that girls with only general school certificates seem to progress as well as those who have already passed their higher school certificate; both classes appear to be able to learn their new duties at about the same speed.

Twelve Weeks' Course

A normal class contains about thirty pupils. The course takes twelve weeks, and in that time the girls are given the elementary knowledge of analytical work, both qualitative and quantitative, that will be required of them when they start work at an out-station of the Chemical Inspection Department where they have to test materials and find out if these are up to specification. Most of the student's day is devoted to practical work in the laboratory. Time spent on lectures is reduced to the

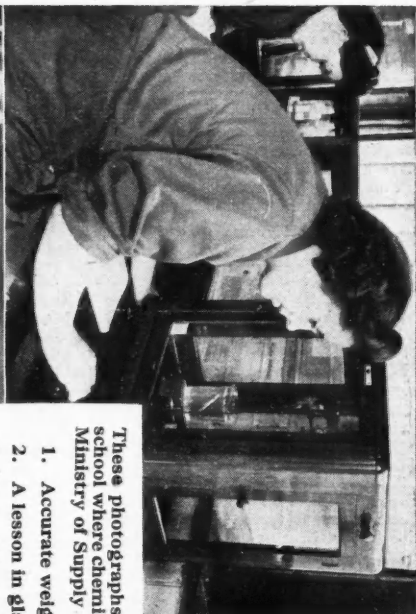
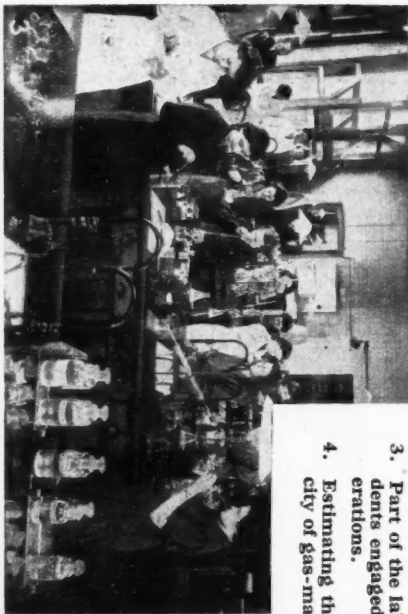
bare minimum; for example, a morning's work may be all practical except for a lecture lasting twenty minutes, intended only to give the theoretical background needed to explain the laboratory work, and to give it its context in "out-station" practice.

During the course the girls acquire the necessary skill in handling the usual kinds of apparatus and instruments. For instance, they start by learning how to weigh; they continue to practise with the balance until they can weigh an object with an accuracy of 0.0001 gm. "Balance shyness," a phenomenon which is to be observed in most school laboratories, soon disappears, although the instruments with which the girls work are of a type more complicated and more sensitive than those used in a school laboratory.

Analytical Training

The elementary training in quantitative and qualitative analysis takes these students slightly farther than would the ordinary course for the Higher Certificate. (Incidentally the qualitative course takes only a week.) One feature that is worth noting is the integration of the various volumetric and gravimetric analyses; for instance, sodium bicarbonate is standardised against standard sulphuric acid solution; that sulphuric acid solution is standardised against sodium bicarbonate, and then used to standardise caustic soda solution; the last-named solution is then used against oxalic acid, enabling potassium permanganate, ferrous ammonium sulphate, potassium dichromate, sodium thiosulphate, and iodine, in turn, to be estimated. From the technical point of view of accuracy this chain linkage of solutions is bad, for it leads to an accumulation of errors; nevertheless it has a high educational value, and for this reason is worth while.

To this chemical work is added the performance of certain physical tests; for instance, finding the specific gravities of various liquids and solids, the setting point of T.N.T., and so on. During this training the opportunity is taken of making the girls familiar with the varieties of material that they will be testing when they start work, materials that at first sight may seem more formidable than they actually are; for example, if the girls have to make a gravimetric estimation of magnesium they do it on a mixture containing magnesium powder and resembling the kind of mixture that is used in flares. Many explosive mixtures are "faked" to resemble—from the analytical point of view—the real thing. Wherever



These photographs were taken in the school where chemical assistants of the Ministry of Supply are trained.

1. Accurate weighing is essential.
2. A lesson in glass manipulation.
3. Part of the laboratory, with students engaged in a variety of operations.
4. Estimating the adsorption capacity of gas-mask charcoal.



possible, a practical exercise is made to have a utilitarian function; e.g., students are not instructed "to carry out a Volhard titration," but "to find the percentage of water-soluble chloride in the sample of paper"; again, estimation of available chlorine by thiosulphate, etc, becomes "examination of anti-gas ointment." Methods for correct sampling of bulk supplies are also explained and arrangements are made for the students to obtain practical experience during the course in order that the importance of this activity, in relation to chemical and physical testing, may be fully appreciated.

The course represents a significant experiment in science teaching. The fact that already one big chemical firm has seen fit to introduce a similar course of training for its own technicians is an indication that industry is alive to the prospect that the gaps in the ranks of the chemical technician class may best be filled through some such channel as this, a channel which existing educational organisation makes little or no attempt to provide.

After training, the girls pass out from this school to out-stations of the Chemical Inspection Department; a few of them have gone to Government research establishments, while yet others have become laboratory assistants at Royal Ordnance Factories. With the Inspection Department of the Ministry of Supply such girls are responsible for a considerable proportion of the routine testing of Army equipment—equipment which includes such diverse items as explosives, clothing, gas, mask constituents, anti-gas ointments, paints, oils and plastics.

Leather Chemistry Research

Control of Acids and Salts

AT the fifth meeting of the Manchester Group of the British Section of the International Society of Leather Trades' Chemists (held on April 22 at the Engineers' Club, Manchester), a paper was given by Dr. R. Laurence Okell on "Acids and Salts as a Control Factor in Tannery Practice." He pointed out that a detailed analysis of the ash of tanning materials indicated that the major portion of the ash was in the form of the metallic oxides of potassium, magnesium, calcium, sodium, iron, and aluminium. The mineral constituents of weak suspender liquors were shown to amount to about half the soluble non-tans present. Quite apart from the acids used by the tanner, the highly acidic nature of some of the materials used, particularly the pyrogallol tannins, was indicated. After referring to the modern conception of the structure of the molecular grid in collagen resulting from the X-ray methods of inves-

tigation carried out by Astbury, Dr. Okell dealt with the effect of acids and salts on the plumping and swelling of collagen. The fact that an increase in the pH of a tannage resulted in a firm and red leather, and also one more prone to hydrolytic decomposition, while an increase in the salt content led to soft and more yellow leather, was stated to be a sound reason for the control of acids and salts throughout a tannage.

Discussing the more frequently used tanning materials, the speaker demonstrated that those materials with a high total acid content were generally the pyrogallol group of tannins, and those of low acid content the catechol tannins. The natural salt content of some of the acid tannins was shown to be the probably underlying cause of their lack of astringency compared with those of high acid content and low salt content. Chestnut extract was shown to be outstanding in that the salt/acid ratio was extremely low. Under works conditions chestnut substitutes had proved highly satisfactory in that the complete removal of chestnut from a tannage previously using 60 per cent. had been adequately compensated by maintaining the salt/acid ratio at its previous level.

New Tanning Materials

A second paper, on "The Application of Research and Modern Ideas in Light and Heavy Leather Manufacture," was read by Mr. G. H. W. Humphreys. He emphasised the necessity for closer co-operation between those responsible for pure research into the fundamentals of leather science, the technologist, the practical man, and the user of the finished leather. The suggestion was made that experiments should be conducted in conjunction with horticultural research to find fresh home-grown tanning materials.

The lecturer stated that the tanning of light leather with iron salts had attracted great interest, especially in America, and a combination chrome/iron tannage appeared to be a distinct commercial possibility. The production of white leather which was washable and fast to light was now being done in America, utilising the salts of zirconium, the necessary salt being obtainable commercially under the name of Nera-chrome N.

Regarding the application to the leather trade of the tremendous strides made by the plastics industry, it was suggested that aqueous solutions of urea-formaldehyde resins, which could be polymerised or hardened by weak solutions of organic acids, and emulsions of freshly polymerised resins were of interest as a possible means of improving the water resistance of sole leather. Polyvinyl chloride might also be calendered on to sole leather to enhance its wearing and water-resisting properties.

Personal Notes

A portrait of **SIR HENRY DALE**, president of the Royal Society, is to be seen at the Royal Academy. It is painted by Francis Dodd, R.A.

PROFESSOR ALEXANDER FINDLAY, president of the Royal Institute of Chemistry, has been elected an honorary member of the Society of Public Analysts.

MR. VICTOR BARTRAM is resigning from the office of vice-president of the Society of Chemical Industry at the end of the current session, and will be succeeded by **DR. R. S. JANE**.

We take great pleasure in reproducing the portrait, by **Maurice Codner**, presented to **MR. VICTOR BLAGDEN** in recognition of



Mr. Victor Blagden.

his 21 years' service as chairman and president of the British Chemical and Dyestuffs Traders' Association. As recorded in our last week's issue, Mr. Blagden handed the portrait back to the Association to hang in the Council Chamber.

The following officers were elected at the annual meeting of the South Yorkshire section of the Royal Institute of Chemistry on May 15: **Chairman**, **DR. R. A. MOTT**, director of Midland Coke Research (in succession to **MR. E. J. VAUGHAN**); **vice-chairman**, **DR. E. A. J. MAHLER** (in succession to **MR. A. H. DODD**); **hon. secretary**, **MR. A. TAYLOR**; **hon. treasurer**, **MR. G. PARKIN**, who served as **hon. secretary** last year.

MRS. S. M. TRITTON, F.R.I.C., consulting chemist, has been elected president of the Ilford Business and Professional Women's Club.

At the annual meeting of the South Yorkshire section of the Royal Institute of Chemistry on May 15, the Newton Chambers Prize was presented, by **MR. H. E. G. WEST**, managing director of Newton, Chambers & Co., Ltd., to the winner of the first award, **DR. L. A. STOCKEN**, a biochemist, for work which will in due course be published.

PROFESSOR A. V. HILL, secretary of the Royal Society, has accepted the invitation of the Society of Chemical Industry to deliver the Messel Lecture, and it is anticipated that he will be dealing with some aspects of the organisation of science in India, a subject which he has studied at first hand on behalf of the Indian Government. The first Lister Lecture is to be given by **PROFESSOR A. FLEMING**, discoverer of penicillin, announces the S.C.I. Council.

In the May examinations for the Fellowship of the Royal Institute of Chemistry, the following were successful. In Organic Chemistry: **DR. D. H. R. BARTON**, **MESSRS. A. HOLT, W. HUNTER, T. LEIGH, S. C. MITCHELL, E. N. WHITE**; in the Chemistry (including Microscopy) of Food and Drugs, and of Water: **MESSRS. D. W. BOUCHIER, A. H. COOMBS, N. HERON, W. R. THOMPSON**; in Agricultural Chemistry; **MR. A. E. MARTIN**; in Industrial Chemistry, with special reference to Power Station Operation and Practice: **MR. E. W. F. GILLHAM**; in General Analytical Chemistry: **MR. H. W. PARKER**; in Water Supply and the Treatment of Sewage and Trade Effluents: **DR. R. C. HOATHER**, **MESSRS. G. D. MILES, F. W. ROBERTS**.

Obituary

MR. H. V. PARKER, joint managing director of the Union Oxide & Chemical Co., Ltd., Flitton, Beds., died on May 13, aged 52.

The death is announced of **MR. LEONARD CLEMENT**, M.A. (Cantab), F.R.I.C., on May 14 at Chester in his 60th year. After graduating with honours, he became assistant analyst in the Custom House Laboratory. In 1907-1914 he was chemist and then manager of the Corporation Sewage Works, Nelson, Lancs., also acting as consultant bacteriologist to other departments. After serving in the B.E.F. as a Sergeant with the special brigade of R.E. concerned with gas warfare, he was recalled to this country and given a very responsible position at the Royal Ordnance Factory, Gretna. In 1919 he joined the Shell Marketing Company, later known as the Shell Refining & Marketing Company. He had been a Fellow of the Institute since 1911.

General News

From Week to Week

The firm of Allen & Hanburys has been added to the list of manufacturers of penicillin, THE CHEMICAL AGE understands.

Workers at Royal Ordnance Factories in England and Wales have raised over £12,000 for the Red Cross Penny-a-Week Fund.

The Chemical Inspection Department of the Ministry of Supply last year examined about 1,500,000 samples of war materials.

Two errors in the Control of Containers and Packaging (No. 1) (General) Order, 1944(a), are corrected in S.R. & O. 1944, No. 506.

A new automatic pipette filler, giving accurate and rapid results, is described by A. A. Houghton, of I.C.I., Ltd., in *Chemistry and Industry*, May 20, p. 193.

The M.A.P. Specification D.T.D. 438, for graphited wax, has been reprinted with Amendment List No. 1, and is available from the Stationery Office, price 6d.

The latest issue of "600," the magazine of George Cohen Sons & Co., Ltd., is up to the usual bright standard, and contains two interesting though necessarily brief articles on hydraulic presses and cranes.

The British Plastics Federation has collaborated with the British Council and British Foundation Films in the preparation of a film about plastics. This film, intended primarily for propaganda purposes overseas, will also be shown in Britain.

The new unit for research in applied psychology, which has been established at Cambridge (by arrangement with the University) by the Medical Research Council, will undertake, when required, investigations within the field of the Council's Industrial Health Research Board.

State bursaries in science will again be awarded by the Board of Education and the Scottish Education Department this year. All candidates must have reached the age of 17 by July 1. Boys must be under 19 on December 31, 1944, and girls under 19 on September 30. Candidates should have passed the Higher Certificate or the Scottish Senior Leaving Certificate Examination in mathematics and scientific subjects.

New methods for differentiating between samples of glues and gelatines are described by A. Steigmann in *J. Soc. Chem. Ind.*, 1944, 63, 3, p. 96. Differences in viscosity are magnified by the addition of anionic detergents such as Teepol. The author also gives details of setting-point tests done with cold urea/gelatin solutions, it being claimed that this new technique reflects more effectively the different capacities of gelatins to form gels.

The fatty-acid compositions of the following vegetable materials are given in a report by T. P. Hilditch *et al.* in *J.S.C.I.*, April, 1944, p. 112; niger seed oil, alfalfa (lucerne) seed oil, and oyster-nut fat. The report also refers to a mould of the *Penicillium* genus which proved unusually rich in fat when grown on soya-bean lecithin.

The Paint Centre, Ltd., has been formed as a public company (Registered No. 381,467), with a capital of £100 in 100 £1 shares, to provide a central club for persons in the paint industry of allied trades. The subscribers are directors of companies in the trades concerned, and the registered office is at 10 St. Swithin's Lane, London, E.C.4.

The Federation of British Industries has decided to strengthen its organisation on the research side by making its Industrial Research Committee a permanent standing committee, with its own fully-qualified secretariat. Through the work of this committee the F.B.I. will do all in its power—in collaboration with existing organisations in this field—to promote the interests of industry in relation to research and its application.

A question about fish-feeding experiments made in the sea-loch Sween in Argyllshire, where the waters were fertilised with sodium nitrate and phosphates, was asked in the House of Commons last week by Mr. Murdoch MacDonald. The Secretary of State for Scotland said the initial experiments suggest that artificial feeding leads to a 300 per cent. increase of the plankton upon which plaice and other flat fish feed. The trials are being extended.

The addition of calcium or sodium bicarbonate to water inhibits the attack of water on lead, according to Laddard and Banks (*J.S.C.I.*, 1944, 63, 2, 39-48). Their presence favours the formation on the lead surface of a protective film of basic lead carbonate, even in the presence of carbon dioxide, provided that the water is free from chlorides. As little as 4 parts of $\text{Ca}(\text{HCO}_3)_2$ per 10,000 is sufficient to inhibit attack by distilled water.

About 120 names are added and about 160 deleted in the schedule to the Trading with the Enemy (Specified Persons) (Amendment) (No. 6) Order, 1944 (S.R. & O. 1944, No. 546). Among the additions are: Laboratorios "Alecór" and "Quimapur," F. A. de Figueroa 1551, Buenos Aires; S.A.L.E.M., S.A., Ltda., Establecimientos Metalúrgicos, 9 de Julio 1019-41, Tucumán, Argentina; Laboratorios Industriales, Lórache, Spanish Morocco; and "Chemfi" (Chemie Finanzierungs A.G.), Talacker 29, Zurich.

Foreign News

The Canadian War-time Bureau of Technical Personnel has registered some 31,000 technical experts to date.

Production of chlorine has started in Peru, with the establishment of a single small unit.

Alcohol production based on molasses and cane juice, in the U.S.A. was 46,000,000 litres in 1943, as against 23,300,000 litres in 1940.

The flotation of a new company to exploit South African vermiculite is expected shortly, according to the Johannesburg correspondent of the *Financial News*.

A modern tannery has been opened at Apapa, in Nigeria, and will deal with up to 2000 hides a month, states a Colonial Office announcement.

Mendeléev first proposed the periodic classification of chemical elements 75 years ago. His periodic table was announced in a paper presented to a meeting of Russian chemists on March 6, 1869.

Nazi press reports give Rumania's monthly output of synthetic rubber in 1943 as 125 metric tons. In 1938 the figure was only 8 tons, rising to 53 tons in both 1939 and 1940, and to 70 tons in 1942.

At the annual meeting of African Explosives and Industries, Ltd., held on March 31, it was proposed that the name of the company should be changed to "African Explosives and Chemical Industries, Ltd."

The American Standards Association has published a booklet in Spanish about the elements of industrial standardisation. It stresses the importance of international co-operation in the development of standards to facilitate trade.

The toxicity of synthetic rubbers is receiving the attention of the U.S. Office of the Rubber Director, whose interim report, published in *Rubber Age*, Feb., 1944, p. 428, suggests that rubber for use in connection with food containers should be made with alpha-naphthylamine and diphenylamine derivatives instead of phenyl-beta-naphthylamine. The last-named compound is now undergoing tests in view of the carcinogenic properties exhibited by beta-naphthylamine.

Following the recent large-scale Portuguese orders given to a Swiss group, the Carl Thiel Company of Zurich (as reported at the time in *THE CHEMICAL AGE*), it is now revealed that the same group has secured an important order from the Spanish Government. The project in question concerns the construction of a plant for the production of special papers used for the printing of currency, share certificates, and similar documents. The name of the proposed plant is *Fabrica Nacional de Moneda y Timbre*, Madrid.

A new plant for the production of bromine and bromides, with an annual capacity of 2½ million lb., has been established at Trona, California, by the American Potash and Chemical Corporation.

Copper produced by smelters from domestic ores in the United States reached the record figure of 1,104,500 short tons in 1943, compared with 1,087,991 in 1942, when the million-ton mark was first exceeded.

The paper, by Filachione, Lengel and Fisher, on the pyrolysis of lactic acid derivatives presented to the American Chemical Society last September (*THE CHEMICAL AGE*, 1943, 49, 415) is published in full in *J. Am. Chem. Soc.*, 1944, 66, p. 494.

All demands of the Government of India for mepacrine, sulphonamides, and emetine for civil purposes have been met, stated the Secretary of State for India last week. Prices are controlled under the Drugs Control Order, 1943.

Russian workers claim that ethyl formate is an effective insecticide that can be easily prepared at a low cost. A reference to the use of this chemical in warehouses is to be found in *Chemical Abstracts* (1944, 37, 5164).

Isolation of an active chemical extract, called Niparol, which enables jute and coconut fibre to be retted in 8-10 hours is announced by Parakutty Baruah and Dr. H. K. Baruah, of the Bose Research Institute, India, in a letter to *Science and Culture* (1944, 9, p. 395).

New alkaline electrolysis plant has been set up by the Pennsylvania Salt Manufacturing Co. at Portland, Oregon, mainly for the production of chlorates of potassium and sodium. Similar plants are planned by the same company at Wyandotte, Mich., and Tacoma, Wash.

The Spanish Scientific Research Council (Consejo Superior de Investigaciones Científicas) has lately opened an Institute for Photochemistry at Tarragona under the direction of the brothers Fajol, who report the discovery of a new highly sensitive emulsion.

Auxin treatment makes it possible to propagate cinchona plants by cuttings. Two per cent indole butyric acid in lanoline has produced the best results, according to A. Guha Thakurta and B. K. Dutt, of the Bose Research Institute in *Science and Culture* (1944, 9, p. 401).

The possibility of further finds of radioactive minerals in the Yukon and North-Western Territories is suggested by the recent action of the Canadian Government in passing Orders-in-Council reserving to the Crown the right to all radio-active minerals found in these districts in lands covered by entry or lease grants.

A plant for processing gypsum is under construction by Compañía Industrial "El Volcan" S.A., of Chile, at Almendral in the province of Coquimbo. Gypsum deposits in the district contain 93 per cent. calcium sulphate, and the output target for the plant will be 20,000 metric tons a year.

The Bethlehem Steel Corporation is considering the establishment of manufacturing plants outside the United States, announces Mr. Eugene Grave, the company's president. He declared that the competitive position of the American steel industry in the world markets has deteriorated due to high wages and raw material prices.

Propylene laurate, a light amber, non-hygroscopic, non-toxic, almost odourless oil has been put on the U.S. market by the Beacon Co. of Boston, Mass. Its emulsifying action in oils, oil-soluble dyes, hydrocarbons, etc., is likely to interest firms making emulsions for treating wood, leather and metals.

Estimated world production of crude petroleum and petrol substitutes for 1942 is set at 2,208,000,000 barrels, a decrease of 171,000,000 barrels from 1941. Crude production is believed to have decreased by 9 per cent., while petrol substitutes increased by 20 per cent. About 7.5 per cent. of the output is attributed to petrol substitute.

National Chemical Products, Ltd. (of South Africa), has acquired the total shareholding of the Umgeni Distilleries, Durban. Plant extensions at Umgeni are being put in hand, and several products, including dry ice, which have hitherto been made only at the National Chemical Products distillery at Germiston, will be manufactured at Umgeni to meet coastal requirements.

The War Production Board, Washington, has ordered reductions in magnesium production at five plants located in various parts of the United States. The reduction will amount to 34,000,000 lb. per annum, or less than 6 per cent. of the country's capacity. The plants affected and the reductions in production in relation to rated capacity are: Electro Metallurgical Co., Spokane, Wash., 50 per cent.; Permanente Metals Corporation-Manteca, Manteca, Calif., 50 per cent.; Ford Motor Co., Dearborn, Mich., 100 per cent.; Matheson Alkali Works Inc., Lake Charles, La., 100 per cent.; and Amco Magnesium Corporation, Wingdale, N.Y., 35 per cent.

Forthcoming Events

The **Association of Scientific Workers** holds its annual council meeting on **May 27, 28, and 29** at Beaver Hall, Garlick Hill, London, E.C.4. The sessions start at 2 p.m. on the Saturday, and at 10 a.m. and 2 p.m. on the other two days.

The annual meeting of the **Agriculture Group of the Society of Chemical Industry** takes place on **June 1**, at 3 p.m., in the rooms of the Institution of Chemical Engineers, 56 Victoria Street, London, S.W.1.

The next meeting of the **Midlands Centre of the Electrodepositors' Technical Society** will be held on **June 6**, at 6 p.m., at the James Watt Memorial Institute, Birmingham, when Mr. H. C. Clements will open a general discussion on electrical plant with a paper on "The Maintenance of Motor Generators."

The **Peter Le Neve Foster Lecture of the Royal Society of Arts** will be given on **June 7**, at 1.45 p.m., in the society's rooms, John Adam Street, London, W.C.2; by Professor H. W. Florey, F.R.S. His subject will be "Penicillin." Professor A. Fleming will be in the chair.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

PORTLAND PLASTICS, LTD., London, W. (M., 27/5/44.) May 1, £5000 debentures; general charge. *—, May 7, 1944.

Satisfactions

MADELEY WOOD COLD BLAST SLAG CO., LTD. (M.S., 27/5/44.) Satisfaction May 8, of debentures registered June 3, 1935.

PILKINGTON BROTHERS, LTD., Liverpool, glass manufacturers. (M.S., 27/5/44.) Satisfaction May 3, of debenture stock registered May 4, 1925, to the extent of £45,000.

Declaration of Solvency Filed

KALIUM, LTD., London, E.C. (D.S.F., 27/5/44.) Dealers in carbonate of potash. May 1.

Company News

Cerebos, Ltd., have declared a final dividend of 30 per cent., making 40 per cent. for 1943 (same).

Bede Metal and Chemical Co., Ltd., report a net profit for 1943 of £3257 (£9403), and a first and final dividend of 9d. (1s.) per 8s. share.

Griffiths Hughes Proprietaries, Ltd., announce, for the year to March 31 last, a final ordinary dividend of 6 per cent. (4 per cent.), making 8 per cent. (6 per cent.).

The International Nickel Co. of Canada is paying an ordinary dividend of 44 cents a share for the quarter ending March 31, as against 51 cents for the preceding quarter and 52 cents for the first quarter of 1943.

African Explosives and Industries, Ltd., announce a net profit, for the year ended September 30, of £590,444 (£675,253). The ordinary dividend is 20 per cent. (25 per cent.).

Babcock & Wilcox, Ltd., with a final dividend of 6 per cent. and a 1 per cent. bonus, are repeating the total ordinary dividend of 11 per cent. for the fifth successive year. Net profit was £638,583 (£594,943).

British Alkaloids, Ltd. (manufacturers of "T.C.P."), are paying the following final dividends in respect of the year ended March 31: 11.126 per cent. on the participating preference shares, making 19.126 per cent. (17.86 per cent.); 18 per cent. on the ordinary shares, making 30 per cent. (27½ per cent.).

New Companies Registered

Goder and Moore, Ltd. (387,484).—Private company. Capital: £2000 in 2000 shares of £1 each. Manufacturers of and wholesale and retail dealers in chemicals, etc. First directors: Lt.-Col. St. John A. Browne and B. B. Hole. Registered office: 13 Southampton Place, London, W.C.1.

Leda Chemicals, Ltd. (387,441).—Private company. Capital: £100 in 50 preference shares of £1 each and 1000 deferred shares of 1s. each. To carry on the business of consulting, analytical, manufacturing and general chemists, etc. Subscribers: Dr. Hyman Yarrow (first director); T. Leader. Registered office: 44a Finsbury Square, London, E.C.2.

Independent Petroleum Federation, Ltd. (387,610).—Company limited by guarantee without share capital. To protect and unite the interests of persons engaged in the trade of dealers in and handlers of petroleum and petroleum products in the United Kingdom, etc. The Council is to consist of the chairman, vice-chairman and eleven ordinary members, viz.: two representing importers, four representing distributors, four representing importer-distributors, and one representing refiners. Subscribers: Grosvenor Petroleum Marketing Co., Ltd., Major & Co., Ltd., Cities Service Oil Co., Ltd., Anglo-Dutch Petroleum Co. (Western), Ltd., C. T. Bowring & Co., Ltd., Harris & Dixon (Oil), Ltd., Universe Petroleum Co., Ltd. Registered office: Grosvenor Mansions, 76 Victoria Street, London, S.W.1.

Chemical and Allied Stocks and Shares

STOCK markets continued firm, although the volume of business in most sections was only moderate. Industrial shares showed individual features of strength, while British funds again recorded a number of fractional gains. Imperial Chemicals strengthened to 39s. 9d., buyers being attracted by the yield of 4 per cent. B. Laporte continued to hold their rise to 80s. Lever & Unilever were little changed at 35s. 3d.; the yield on shares of the last-named company is only small on the basis of last year's 5 per cent. dividend. Triplex Glass were better at 39s. 4½d.; this is another instance where sentiment is influenced mainly by hopes of improved dividends after the war. British Oxygen moved higher at 81s. 6d., while Turner & Newall were firm at 84s. 6d., as were also Barry & Staines at 47s. and British Aluminium at 47s. 3d. De la Rue moved higher to 182s. 6d. on market hopes that results will show a further rise in profits with at least maintenance of the dividend. British Industrial Plastics 2s. shares were 7s., and Erinoid 11s. Lewis Berger were 103s. 6d., but Pinchin, Johnson eased to 37s. following an earlier rise.

Dunlop Rubber (43s. 3d. xd.) were inclined to ease on the preliminary figures for the past year's working; these represent a good achievement, maintenance of the dividend at 8 per cent. being in accordance with general expectations. Associated Cement remained around 65s. 6d. following publication of the full report. Activity around 33s. was shown in British Plaster Board, which were among shares favoured for their post-war prospects; maintenance of the dividend is expected during the remaining period of the war. General Refractories 10s. shares have been firm at 17s. The units of the Distillers Co. were 92s. 9d., and United Molasses 6s. 8d. units 33s. 6d. Wall Paper Manufacturers deferred have been favoured and moved higher at 42s. 6d.

Iron and steel shares became less active, but recent gains were held in most instances, with United Steel 26s. 9d., Dorman Long 27s. 9d., Stewarts & Lloyds 55s. 3d., and Babcock & Wilcox 50s. 9d. Guest, Keen eased to 37s. 10½d. but Consett Iron 6s. 8d. units remained firm at 9s. 4½d. on talk of the possibility of a higher dividend. Allied Ironfounders were 53s. 9d., but Pressed Steel reacted to 30s. 4½d. on the reduced profits for the past year's working. Amalgamated Metal were 18s. 1½d., and Imperial Smelting 14s. 3d. Textile shares have been inclined to move better under the lead of Fine Spinners, which were 23s. 3d. on the improved dividend and the decision to repay the funding certificates. Bradford Dyers rallied to 21s., and Calico Printers were 15s. 6d.

Elsewhere, Griffiths Hughes provided a good

feature with a rise to 29s. on the increased dividend. Beechams deferred were higher at 18s. 1½d. on the view that, bearing in mind dividend payments made to date, the results are likely to show higher profits. Borax Consolidated have been firmer at 60s. Murex were 105s. 7½d., and Metal Box 88s. 1½d. Cannon Iron Foundries improved to 18s.

W. J. Bush were again 60s., Monsanto Chemicals 5½ per cent. preference 23s., British Drug Houses 26s., and Burt Boulton 23s. Greeff-Chemicals 5s. ordinary remained at 7s. 3d. Gas Light & Coke ordinary have been steady at 21s. 3d. Morgan Crucible 5½ per cent. preference were 26s. 9d. British Glues & Chemicals 4s. ordinary kept firm at 9s., awaiting the dividend announcement. Fisons were 51s. Boots Drug 5s. ordinary showed steadiness at 43s. 9d., while Sangers were 27s. 1½d., and Timothy Whites 34s. 1½d. Oil shares developed no very decided tendency, although Anglo-Iranian moved higher at 119s. 4½d.

British Chemical Prices

Market Reports

HEAVERY chemical products generally are moving steadily into consumption against contracts, while a moderate volume of fresh inquiry and new business has been reported on the London chemical market during the past week. Market conditions are strong so far as quotations are concerned. In the soda products section there is a steady call for both solid and liquid caustic, chiefly against existing contracts, and quotations for these, as well as for soda ash and bicarbonate of soda, are maintained on a very firm basis and are in good demand. A steady trade is passing in both Glauber salt and salt cake and the distribution of bichromate of soda continues on

a quota basis without any modification of the price position to report. In the potash section an extremely tight supply position continues to be indicated in respect of liquid caustic, while the solid material is being distributed to consumers according to needs and on the basis of the official rates. Yellow prussiate of potash is available in limited quantities, while a steady inquiry is reported for acid phosphate of potash. In other directions arsenic is in good demand and the market for the material is very firm, while British-made formaldehyde is receiving a good inquiry. Pressure for supplies of crude and refined glycerine is maintained, and there is a fair demand for alum lump. Quieter conditions are reported in the coal-tar products market this week, with a reasonable demand for pitch for home consumption. The anthracene oils are a good market and contracts for cresylic acid and creosote oil are being steadily drawn against. The toluids and benzols are steady.

MANCHESTER.—Although business in heavy chemical products on the Manchester market during the past week has about maintained its recent level, a much quieter spell is expected next week in consequence of the Whitsun holiday, and both new bookings and contract deliveries are likely to be adversely affected. In the meantime the general run of potash products are being absorbed to the full extent of offers, and a steady demand is being experienced for alkalis and for a wide range of miscellaneous chemicals, including borax and boric acid, alum, sulphate of alumina, acetone, and formaldehyde.

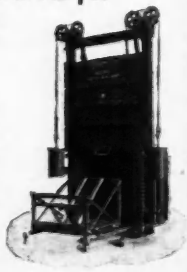
GLASGOW.—In the Scottish heavy chemical trade business during the past week has maintained its steady day-to-day routine, with the prices remaining unchanged. Export trade is still very quiet.

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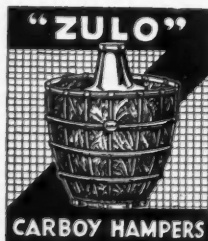
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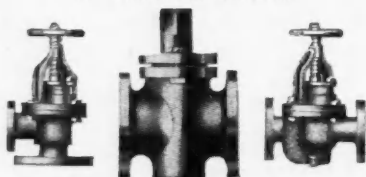
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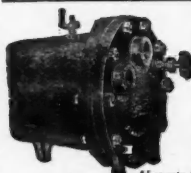
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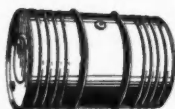
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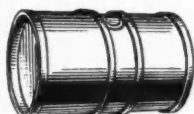
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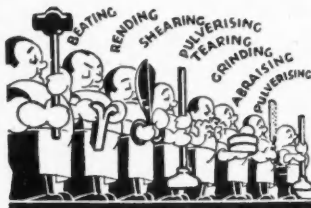
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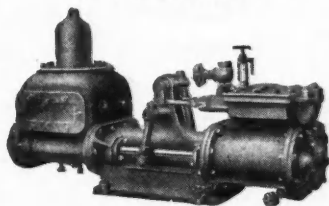
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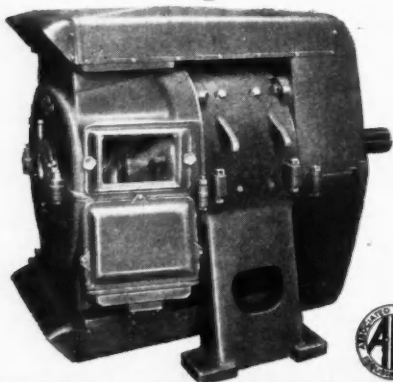
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